CLAIMS

1. An ultrasonic transducer device comprising:

an element that converts impinging acoustic energy into outputted electrical energy and that converts inputted electrical energy into outgoing acoustic energy; and

a body of acoustically attenuative material that is acoustically coupled to said element, wherein said acoustically attenuative material comprises particles of an acoustic scattering material having an average diameter less than 20 microns and particles of an acoustic absorbing material having an average diameter less than 20 microns, said particles of acoustic scattering and absorbing material being dispersed in a matrix.

2. The ultrasonic transducer device as recited in claim 1, wherein said acoustic scattering material comprises tungsten.

3. The ultrasonic transducer device as recited in claim 1, wherein said acoustic scattering material further comprises a material having a density lower than the density of tungsten.

4. The ultrasonic transducer device as recited in claim 2, wherein said material having a density lower than tungsten is TiO_2.

5. The ultrasonic transducer device as recited in claim 4, wherein said matrix comprises epoxy.

6. The ultrasonic transducer device as recited in claim 1, wherein said acoustically attenuative material comprises 25-45 wt.% tungsten particles, 15-35 wt.% silicone particles and 40-60 wt.% epoxy.

7. The ultrasonic transducer device as recited in claim 1, wherein said acoustic absorbing material is silicone.

8. The ultrasonic transducer device as recited in claim 7, wherein said silicone particles are in the form of non-agglomerated powder or beads.

9. The ultrasonic transducer device as recited in claim 7, wherein the shape of said silicone particles is substantially spherical.

10. The ultrasonic transducer device as recited in claim 5, wherein said epoxy is selected from the group consisting of aromatic or aliphatic organic molecules that have been cross-linked with a curative taken from the group consisting of an amine or an anhydride.

11. The ultrasonic transducer device as recited in claim 10, wherein said epoxy comprises the diepoxide of bisphenol-A formed by reaction with epichlorohydrin and said curative comprises an aliphatic amine.

12. The ultrasonic transducer device as recited in claim 5, wherein said epoxy has a glass transition temperature at least 20°C above the maximum processing temperature to which said acoustically attenuative material is exposed.

13. An ultrasound transducer array comprising a multiplicity of ultrasound transducer elements and a layer of acoustically attenuative material that is acoustically coupled to back surfaces of said ultrasound transducer element, wherein each of said ultrasound transducer elements converts impinging acoustic energy into outputted electrical energy and that converts inputted electrical energy into outgoing acoustic energy, and said acoustically attenuative material comprises particles of an acoustic scattering material having an average diameter less than 20% of the smallest element dimension and particles of an acoustic absorbing material having an average diameter less than 20% of the smallest element dimension, said particles of acoustic scattering and absorbing material being substantially homogeneously dispersed in a matrix.

14. The ultrasonic transducer array as recited in claim 13, wherein said acoustic scattering material is tungsten, said acoustic absorbing material is silicone and said matrix is made of an epoxy.

15. The ultrasonic transducer array as recited in claim 14, wherein said acoustically attenuative material comprises 25-45 wt.% tungsten particles, 15-35 wt.% silicone particles and 40-60 wt.% epoxy.

16. The ultrasonic transducer array as recited in claim 14, wherein said silicone particles are in the form of non-agglomerated powder or beads.

17. The ultrasonic transducer array as recited in claim 14, wherein the shape of said silicone particles is substantially spherical.

18. The ultrasonic transducer array as recited in claim 14, wherein said epoxy is selected from the group consisting of aromatic or aliphatic organic molecules that have been cross-linked with a curative taken from the group consisting of an amine or an anhydride.

19. The ultrasonic transducer array as recited in claim 18, wherein said epoxy comprises the diepoxide of bisphenol-A formed by reaction with epichlorohydrin and said curative comprises an aliphatic amine.

20. The ultrasonic transducer array as recited in claim 14, wherein said epoxy has a glass transition temperature at least 20°C above the maximum processing temperature to which said acoustically attenuative material is exposed.

21. The ultrasonic transducer array as recited in claim 13, further comprising a thin layer of electrically insulative material having a multiplicity of electrically conductive traces formed thereon, at least a portion of said thin layer being embedded in said acoustically attenuative material, and each of said traces being electrically connected to an electrode of a respective ultrasound transducer element.

22. A laminated acoustic backing comprising a multiplicity of flexible circuits with pre-cured sheets of acoustically attenuative material therebetween, each of said flexible circuits comprising a respective thin layer of electrically insulative material having a respective multiplicity of electrically conductive traces formed thereon, and said acoustically attenuative material comprising particles of an acoustic scattering material having an average diameter less than 20% of the smallest element dimension and particles of an acoustic absorbing material having an average diameter less than 20% of the smallest element dimension, said particles of acoustic scattering and absorbing material being substantially homogeneously dispersed in a matrix

23. The laminated acoustic backing as recited in claim 22, wherein said acoustically attenuative material possesses an inelastic compressibility of less than 1% during the lamination process.

24. The laminated acoustic backing as recited in claim 25, wherein said acoustically attenuative material comprises 25-45 wt.% tungsten particles, 15-35 wt.% silicone particles and 40-60 wt.% epoxy.

25. The laminated acoustic backing as recited in claim 24, wherein the shape of said silicone particles is substantially spherical.

26. The laminated acoustic backing as recited in claim 24, wherein said epoxy is selected from the group consisting of aromatic or aliphatic organic molecules that have been cross-linked with a curative taken from the group consisting of an amine or an anhydride.

27. The laminated acoustic backing as recited in claim 26, wherein said epoxy comprises the diepoxide of bisphenol-A formed by reaction with epichlorohydrin and said curative comprises an aliphatic amine.

28. The laminated acoustic backing as recited in claim 24, wherein said epoxy has a glass transition temperature at least 20°C above the

maximum processing temperature to which said acoustically attenuative material is exposed.

27. An ultrasonic transducer device comprising:

an element that converts impinging acoustic energy into outputted electrical energy and that converts inputted electrical energy into outgoing acoustic energy, said element having a smallest element dimension equal to 300 microns or less; and

a body of acoustically attenuative material that is acoustically coupled to said element, wherein said acoustically attenuative material comprises particles of an acoustic scattering material having an average diameter less than 20% of the smallest element dimension and particles of an acoustic absorbing material having an average diameter less than 20% of the smallest element dimension, said particles of acoustic scattering and absorbing material being dispersed in a matrix.